



Agriculture & Horticulture
DEVELOPMENT BOARD



Grower Summary

CP 073

The role of chemicals in the location of host plants by midge pests of UK fruit crops

Final 2014

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Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

HDC is a division of the Agriculture and Horticulture Development Board.

Project Number: CP 073

Project Title: The role of chemicals in the location of host plants by midge pests of UK fruit crops

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Contractor/(s): East Malling Research
Natural Resource Institute

Industry Representative: N/A

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Start Date: February 2011

End Date: February 2014

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Further information

If you would like a copy of this report, please email the HDC office (hdc@hdc.ahdb.org.uk), alternatively contact the HDC at the address below.

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GROWER SUMMARY

Headline

- Potential attractants for females of raspberry cane midge, blackcurrant leaf midge and apple leaf midge have been identified from their host plants at appropriate developmental stages.

Background and expected deliverables

Species of gall midge (Diptera: Cecidomyiidae) are important pests of many horticultural crops and often very difficult to control by conventional means. NRI and EMR have made considerable progress in identification of female sex pheromones in this group of insects, and these are now in commercial use for monitoring populations of several pest species (Hall et al., 2012). However, the female-produced sex pheromones attract only males. Attractants for the females, particularly mated females, would potentially be far more valuable for both monitoring and control of the pests. There is good evidence in several species of midge that mated females are attracted to their host plants for oviposition by specific odours from the plants. Although this has been known for over 40 years in some cases, the chemicals responsible for this attraction have not yet been identified.

This project aims to identify the chemicals responsible for attraction of mated female midges to oviposition sites on their host crop for up to three species which are important pests of soft and tree fruit crops in the UK, and where such attraction has been demonstrated previously. These are the raspberry cane midge (*Resseliella theobaldii*), the blackcurrant leaf midge (*Dasineura tetensii*) and the apple leaf midge (*Dasineura mali*).

Summary of the project and main conclusions

Gravid female raspberry cane midges lay their eggs in splits in young green raspberry primocane. Field observations supported previous reports that they are attracted to volatile compounds produced from the splits. Volatiles were collected from canes before and after splitting by solid-phase microextraction (SPME) and trapping on a solid adsorbent. Compounds were identified which were present only, or in much larger quantities after the canes are split using gas chromatography linked to mass spectrometry (GC-MS). A lure was developed based on these volatiles and

field tested in a variety of traps. The numbers of females captured were low and no significant difference was seen between traps baited with the lure and those left unbaited. Subsequent work was restricted by lack of midge populations in the field.

Blackcurrant leaf midge females lay their eggs on young blackcurrant shoots. Volatiles were collected from blackcurrant shoots and the compounds present were identified by GC-MS. The collections of volatiles were also analysed by gas chromatography linked to electroantennographic recording (GC-EAG) from the antennae of male or female midges and some EAG-active components identified as potential attractants. Wind tunnel and olfactometer bioassays were developed to test the attraction of female blackcurrant midges to natural and synthetic compounds. Only limited studies were possible due to lack of a continuous supply of insects.

Female apple leaf midges lay eggs on young apple leaves. Volatiles were collected from young apple shoots using SPME and compounds present were identified by GC-MS analysis. The volatile collections and synthetic compounds were also analysed by GC-EAG using male and female apple midges, but no reproducible responses were obtained.

Financial benefits

- This project has not led to any financial benefits for soft or tree fruit growers.

Action points for growers

- This project has not been completely successful in developing commercially available lures for any midge pests of soft or stone fruit crops, so no action points can be made.